Cameras for the URS-50I Apparatus, Adapted for Photographs at High and Low Temperatures

S/032/60/026/01/037/052
B010/B006

sample is attached. The outer wall also has a projection sealed by a celluloid film. The projection of the inner wall protrudes into that of the outer wall, thus enabling the X-rays to be focussed through the celluloid film on the sample. The temperature of the sample is measured by a thermocouple. Rapid sample heating from - 177° to room temperature can be effected by means of small heating elements. There are 2 figures and 1 reference.

ASSOCIATION: Moskovskiy institut stali im. I. V. Stalina (Moscow Institute of Steel imeni I. V. Stalin)

Card 2/2

UMANSKIY, Yakov Semenovich; LYUTTSAU, V.G., red.; GORDON, L.M., red.izd-va; ATTOPOVICH, M.K., tekhn.red.

[X-ray diffraction techniques for the study of metals] Rentgenografiia metallov. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1960. 448 p. (MIRA 13:12)

(Metallography) (X rays--Diffraction)

UMANSKIY, Ya. S., KAGAN, A. S., SOMENKOV, V. A.

"~~Grain~~. Diffuse Scattering of X-Rays by Aluminum Brass."

Steel Inst., Leninsky Prospekt 6, Moscow, USSR.

paper submitted for 5th Gen. Assembly, Symposium on Lattice Defects, Intl. Union of Crystallography, Cambridge U.K. Aug 1960.

18.8100

77703
SOV/148-60-1-26/34

AUTHORS: Kagan, A. S., Umanskiy, Ya. S.

TITLES: Characteristic Temperature of an Ag-Au Alloy Within a Temperature Range From 279 To 523° K

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Chernaya metallurgiya, 1960, Nr 1, pp 152-154 (USSR)

ABSTRACT: In order to determine the characteristic temperature θ of Ag-Au alloys and of pure Ag in terms of the drop of the diffraction intensities with the increasing atomic thermal vibrations, the authors measured the diffraction intensities at 279-523° K by ionization set URS-50I. When a steady-intensity incident beam is applied

$$\ln \frac{I_{T_1}}{I_{T_2}} \frac{\Phi_{T_2}}{\Phi_{T_1}} = -2M_{T_1} + 2M_{T_2}$$

Card 1/4

holds, where Φ_{T_1}, Φ_{T_2} denote the products of all factors except temperature and

$$2M = \frac{12h^2}{mk\theta}\left[\frac{\Phi(x)}{x} + \frac{1}{4}\right]\frac{\sin^2\theta}{\lambda^2}.$$

describes the Debye-Waller intensity connections. The powdered Au and Ag, containing traces of Fe, Cu, Al, were mixed at 15:85 ratio and molten in an induction furnace with argon atmosphere. The obtained alloy was deformed, homogenized at 950° C for 2.5 hr, powdered and recrystallized at 300° C for 1 hr, after which the crystals became about 1 to 2 μ. The powder was stuck on a copper plate, fastened at the end of an electric heater, and placed on the axis of the X-ray goniometer. Two to three diffraction intensity curves were obtained for each desired interval of temperatures which were

Characteristic Temperature of an Ag-Au Alloy Within a Temperature Range From 279 To 523° K

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controlled by a thermocouple. The method provided ±2.5% accuracy of the computed θ. The mean θ for Ag was found to be 208.5° K which is within 203 to 215° K of values determined by various investigators by means other than X-rays. The θ for the Au-Ag alloy at the intervals of (° K): 279-370, 279-423, 279-474, and 279-523 were 200, 197, 194, and 200° K, respectively. Their average, 197° K, is close to the value determined by R. W. James (198° K) according to the elasticity method. The static or "chemical" distortion of the Ag structure due to the presence of dissolved Au proved to equal zero. This fact is the obvious result of only 0.17% difference between the atomic radii of Ag and Au. The Debye-Waller intensity connections proved to remain valid for the entire temperature interval used in the experiments. The connections are for many solids, composed of less heavy atoms, restricted to much lower temperatures. This is because of the inversely proportional relation of the amplitude of thermal

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vibrations of atoms to the square root of $m\theta^2$ in which atomic mass m is high for both Au and Ag. There is 1 figure; and 9 references, 4 Soviet, 4 U.K., 1 Danish. The U.K. references are: M. Blackman, Phil. Mag., 42, 1951; R. W. James, G. W. Brindley, Proc. Roy. Soc., A 121, 155 1928; R. W. James, F. M. Firth, Proc. Roy. Soc., A 117, 62, 1927; R. W. James, Manchester Memoirs, 71, 9, 1926-1927.

ASSOCIATION: Moscow Steel Institute (Moskovskiy institut stali)

SUBMITTED: December 15, 1958

Card 4/4

GORELIK, S.S.; PAVLOV, A.M.; UMANSKIY, Ya.S.

Connection between the type of crystal lattice, the diffusion coefficient, the interatomic bonding forces and the temperature of recrystallization. Izv. vys. ucheb. zav.; chern. met. no.2: 95-99 '60. (MIRA 15:5)

1. Moskovskiy institut.
(Alloys--Metallography) (Crystal lattices)

20503

S/148/60/000/002/007/008

18.6200

AUTHORS: Mozzhukhin, Ye.I., Yelyutin, V.P., Umanskiy, Ya.S.

TITLE: The Effect of Sintering Conditions on the Strength of Carbide Base Alloys Carburized by a NiAl Compound

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Chernaya metallurgiya, 1960, Nr 2, pp 142 - 147

TEXT: To determine optimum sintering conditions ensuring the preparation of high-strength alloys, the authors studied the effect of various sintering conditions on the properties of Ti-carbide and Ti-W-carbide base alloys carburized by a Ni-Al compound. The effect of sintering conditions on the strength of alloys during bending tests at room and elevated temperatures was mainly studied. Students of the Moskovskiy institut stale (Moscow Steel Institute), Ye.A. Bychkova, L.V. Maksimova and Ye.I. Oginskaya took an active part in the studies. The carburizing alloys contained 54 - 60% (at) Ni. The given theoretical compositions of the investigated alloys are contained in Table 1. The specific weight of Ti-W-carbides was calculated from the weight and volume of the carbide component in hard alloys. It was 11.4 g/cm^3

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The Effect of Sintering Conditions on the Strength of Carbide Base Alloys Carburized by a NiAl Compound

for T15 carbide, 6.16 g/cm^3 for T60 carbide. The alloys were prepared of Ti-carbide powder and complex Ti-W-carbides. Powders of the initial material were mixed in alcohol for 48 hours, dried in air, pressed into briquets and dried in a vacuum cabinet. Sintering was carried out in argon and hydrogen atmosphere, in a laboratory vacuum furnace with a graphite shaft and in a TVV-2 furnace. Optimum sintering conditions were determined from the results of measuring the strength, hardness, specific weight, and changes in the composition of the alloys. Greatest changes in the composition were observed in sintering Ti-carbide-base alloys in a vacuum. Loss of individual components through sintering was calculated after sintering in a vacuum, hydrogen and argon for 1 hour at 1,700°C. The loss amounted to 15% Ti, 67% Al and 13% C of the total amount of the component in the alloy prior to sintering. Minimum loss was observed in sintering in pure argon. Table 2 contains the composition of the T100B (15) alloy prior to and after sintering under different conditions. The strength of alloys during bending was investigated with the aid of a special device on a two-ton testing machine at high temperatures

The Effect of Sintering Conditions on the Strength of Carbide Base Alloys Carburized by a NiAl Compound

without shielding atmosphere. Figures 1 - 5 show the effect of the sintering temperature on the alloy strength during bending. Highest strength of Ti-carbide base alloys was obtained by sintering for 1 hour at 1,900°C. A raise of the sintering temperature up to 2,100°C did not affect the strength (Figure 1), although shrinkage and density of the alloys increased. Extended holding up to four hours entailed decrease in strength; holding time reduced down to 0.5 hrs entailed a decrease in density. The authors contradict the statement made in [Ref 4] that the optimum temperature of sintering for a TiC-NiAl alloy was 1,650°C. They proved experimentally that alloys of highest strength and density were obtained at 1,900°C and above. It was established that optimum mechanical properties of the alloys depended on the optimum amount of the liquid phase during sintering. To obtain this, alloys with a lesser content of binder should be sintered at higher temperatures which raise the amount of the liquid phase due to the dissolving of the carbide component.

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The Effect of Sintering Conditions on the Strength of Carbide Base Alloys Carburized by a NiAl Compound

There are: 2 tables, 5 graphs and 7 references, 6 of which are English and 1 Soviet.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: May 25, 1959

4

Card 4/4

85811
S/148/60/000/003/015/018
A161/A029

18.6100 1497

AUTHORS: Mozzhukhin, Ye.I.; Yelyutin, V.P.; Umanskiy, Ya.S.

TITLE: Strength of Carbide Alloys Cemented by NiAl and CoAl Compounds

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. - Chernaya metallurgiya, 1960, No. 3, pp. 131 - 135

TEXT: An investigation was carried out with titanium and titanium-tungsten carbide powder bound with NiAl and CoAl compounds. The effect of the composition and of different quantities of the binders was determined. The results are illustrated by curves. In case of titanium carbide with 15 volume % NiAl the binder composition had no effect on the alloy strength at room temperature, but a pronounced effect was observed at 1,000°C. Alloys bound with binders of stoichiometric composition proved strongest, and alloys bound with NiAl with 60 atomic % Ni weakest. Alloys with over 25 volume % NiAl have the maximum strength. The strength of TiC-NiAl at 1,000°C was in all cases higher than at room temperature, which not fully corresponds to statements made in a previous investigation (Ref.3). The alloy with high NiAl content had a considerably higher heat resistance than with low NiAl content. Titanium-tungsten carbide T-15 (T-15) and T-60 (T-60) were bound with CoAl with 60 atomic % Co, with 10 and 15 volume % CoAl, respectively.

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S/148/60/000/003/015/018
A161/A029

Strength of Carbide Alloys Cemented by NiAl and CoAl Compounds

A higher strength was observed in alloys with 15 and 20 volume % of NiAl at 900°C than in cold which is explained by higher plasticity of NiAl at 900°C. At higher temperature the alloy strength dropped. The high strength of TiC-NiAl alloys in hot state is apparantly also due to the plasticity of NiAl and stress redistribution. This phenomenon had been observed by G.S. Kreymer, O.S. Safonova and A.I. Baranov (Ref. 4) in WC-Co alloys (maximum strength at 200°C due to softened cobalt.) The following conclusions were drawn: 1) Titanium carbide alloys bound with NiAl have higher bending strength at 1,000°C than at room temperature. 2) Titanium--tungsten carbide alloys with 16% titanium carbide bound by NiAl retain their strength up to 900-1,000°C. 3) Titanium-tungsten carbide bound with CoAl has a higher strength than analogous alloys bound with NiAl. 4) At room temperature the strength of titanium carbide alloys does not depend on the composition of NiAl, but at 1,000°C it does. At 1,000°C alloys bound with NiAl of stoichiometric composition have maximum strength. 5) The carbide base composition is important for alloys bound with NiAl and CoAl. Alloys with pure titanium carbide and titanium-tungsten alloys with high titanium content (64% TiC) have low strength at room temperature, but they retain their strength or even increase it at 1,000 - 1,100°C. There are 4 figures and 5 references: 3 Soviet, 2 English.

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82340

S/139/60/000/03/037/045
E073/E335

18.7500

AUTHORS: Mirkin, L.I. and Umanskiy, Ya.S.

TITLE: Investigation of the State of the Crystal Lattice and the Density of Dislocations in Austenite and Ferrite During Phase Transformations

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Fizika, 1960, No 3, pp 212 - 217 (USSR)

ABSTRACT: The block dimensions and Type II distortions in the α-phase of carbon and alloy steels after various types of heat treatment were measured and the results were described in numerous papers by the School of G.B. Kurdyumov. However, only very few papers are devoted to the intragranular structure of the gamma-phase (Refs 1,2). The authors consider it of interest to investigate the intragranular structure of the α- and γ-phases in steels after various heat treatments. The experiments were carried out on steel 45 (0.4% C) and on austenitic manganese steel (0.4% C, 12% Mn), which were quenched from temperatures between 600 and 1 200 °C and tempered at temperatures of 200 - 700 °C with a

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S/139/60/000/03/037/045

E073/E335

Investigation of the State of the Crystal Lattice and the Density of Dislocations in Austenite and Ferrite During Phase Transformations

soaking time of 1 hour. The investigations were carried out using Fe radiation on URS-50I equipment. The authors proposed using the method of determination of the density of dislocations from the widening of the lines on the X-ray diffraction patterns for studying heat-treatment processes. Data are given on the change of the dislocation densities of the austenite and ferrite during quenching and tempering (Tables 1,2). On the basis of the obtained results, the authors propose the following mechanism for the dislocations during quenching and tempering: during quenching of steel a large number of point defects and dislocations occur in α-phase crystals during γ-α transformation and these are concentrated at block boundaries and distributed inside the block, i.e. distorting the lattice. The increase of the number and length of the dislocations inside the block corresponds to the increase of Type II distortions whilst an increase of the number of closing loops (relaxed defects) corresponds to an increase of the degree of dispersion

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82340

S/139/60/000/03/037/045
E073/E335

Investigation of the State of the Crystal Lattice and the Density of Dislocations in Austenite and Ferrite During Phase Transformations

of the blocks. Thus, the density of dislocations characterises both elements of the fine crystalline structure, namely, the block dimensions and the Type II distortions. There are 3 figures, 2 tables and 9 references, 7 of which are Soviet and 2 English.

ASSOCIATION: NII tekhnologii avtomobil'noy promyshlennosti (Scientific Research Institute on Technology of the Automobile Industry)
Moskovskiy institut stali (Moscow Institute of Steel)

SUBMITTED: July 9, 1959

Card 3/3

80597

S/148/60/000/005/007/009

18.1230

AUTHORS: Skakov, Yu.A., Umanskiy, Ya.S.

TITLE: Investigation Into Changes of Fine Intergranular Structure of a Composite Cobalt-Base Alloy K40HXM (K40NKhM) in Plastic Deformation and Annealing

PERIODICAL: Izvestiya vyssikh uchebnykh zavedeniy, Chernaya metallurgiya, 1960, Nr 5, pp 150 - 158

TEXT: The K40NKhM alloy [Refs 1, 2] is strengthened in a high degree during plastic deformation and is, moreover, subjected to considerable additional strengthening by low temperature annealing. The authors investigated the character of structural changes corresponding to strengthening and softening. The composition of the alloy is given: 0.08% C; 36.4% Co; 20.1% Cr; 15.25% Ni; 7.05% Mo; 16.3% Fe; 0.40% Si; 1.82% Mn. The alloy specimens were subjected to cold rolling (10, 30, 50 and 70% compression) after water quenching from 1,150°C. Tempering was carried out at 100° to 900°C for four hours. At 500°C the tempering time was changed from 2 to 100 hours and at 700°C up to 18 hours. Microhardness of all specimens was measured. The experimental work

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80597

S/148/60/000/005/007/009

Investigation Into Changes of Fine Intergranular Structure of a Composite Cobalt-Base Alloy K40HXM (K40NKhM) in Plastic Deformation and Annealing

was performed with the participation of A.V. Sharshatkina and students of MIS, L.K. Kostin and M.M. Arengol'd, D.I. Gabrielyan and other collaborators of IPS TsNIIChM, in particular V.A. Sol'ts, assisted in the selection and preparation of the test items. Results of experiments are described in detail and the following conclusions are drawn: Strengthening of the alloy by cold plastic deformation and additional strengthening by heating up to 500°C depend on the same factors, i.e. crushing of mosaic domains (down $\approx 10^{-6}$ cm) and large microdeformations of the crystalline lattice of the solid solution (up to $\approx 4.10^{-3}$). However, the significance of these strengthening factors is different in deformation and strengthening tempering. If the degree of compression increases from 50 to 70%, strengthening depends on further crushing of domains; additional strengthening in low tempering of a strongly deformed alloy depends mainly on changes in the character of distribution of microdeformations and their growth. Microdeformations of the crystalline lattice are mainly caused by the fine concentrational heterogeneity in the solid solution. Differentiation of components (first of all molybdenum and carbon) takes place in the zones with dimensions of the order of 10^{-6} cm. A

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S/148/60/000/005/007/009

Investigation Into Changes of Fine Intergranular Structure of a Composite Cobalt-Base Alloy K40HXM (K40NKhM) in Plastic Deformation and Annealing

higher degree of compression, an extended time or higher temperatures of tempering, entail enlarged localization zones of microdeformations in the crystalline lattice of the solid solution; (or enlargement of solid solution zones with higher concentration of Mo and C). Such a structure precedes the separation of the carbide phase and corresponds to maximum hardness. The separation of the carbide phase is accompanied by the elimination of microdeformations of the crystalline lattice and by the sharp enlargement of mosaic structure domains, which causes softening.
There are: 5 sets of graphs, 1 set of microphotos and 6 references, 4 of which are Soviet, 1 French and 1 English.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: April 1, 1959

Card 3/3

S/070/60/005/003/024/024/XX
E132/E460

AUTHORS: Kagan, A.S., Somenkov, V.A. and Umanskiy, Ya.S.

TITLE: An X-Ray Camera for Studying the Diffuse Scattering by Polycrystalline Materials

PERIODICAL: Kristallografiya, 1960, Vol.5, No.3, pp.468-469

TEXT: There are stricter requirements in the use of diffuse scattering methods in metal physics than in ordinary structure analysis. Air scattering and slit scattering must be reduced and the monochromatization must be of a high standard. An attachment for the УРС-501 (URS-501) diffractometer which satisfies these conditions is described. It is basically a cylindrical enclosure with celluloid windows which surrounds the specimen. The enclosure can be evacuated. Slits are provided for removing radiation scattered by the air outside the enclosure from the primary beam from the monochromator. A crystal of Ge (111 plane) is used for monochromatization as it gives no 222 reflexion. The 333 reflexion is suppressed by reducing the tube voltage. When there is no specimen and the direct beam passes straight through the camera, the count rate recorded is equal to the cosmic ray

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S/070/60/005/003/024/024/XX
E132/E460

An X-Ray Camera for Studying the Diffuse Scattering by Polycrystalline Materials

count rate. The apparatus can be used to record the diffuse background between 8 and 45°. Its operation has been tested with specimens of fused quartz and Cu. Comparisons with the theoretical scattering are reproduced and appear satisfactory. There are 3 figures and 4 references: 2 Soviet and 2 English.

ASSOCIATION: Moskovskiy institut stali im. I.V.Stalina
(Moscow Steel Institute im. I.V.Stalin)

SUBMITTED: November 18, 1959

Card 2/2

KAGAN, A.S.; SOMENKOV, V.A.; UMANSKIY, Ya.S.

Diffuse scattering of X rays by a Cu-Al alloy. Kristallografiia 5 no.4:540-543 Jl-Ag '60. (MIRA 13:9)

1. Moskovskiy institut stali im. I.V. Stalina.
(Copper-aluminum alloys—Spectra)
(X rays—Scattering)

KAGAN, A.S.; UMANSKIY, Ya.S.

Cameras for taking pictures at high and low temperatures, attached to the URS-50 I unit. Zav.lab. 26 no.1:108-109 '60. (MIRA 13:5)

1. Moskovskiy institut stali imeni I.V.Stalina.
(X rays--Equipment and supplies)

80887

S/126/60/009/06/014/025

E073/E335

18.7500

AUTHORS: Mirkin, L.I. and Umanskiy, Ya.S.

TITLE: Investigation of the State of the Crystal Lattice and of the Density of Dislocations in the Case of Phase Transformations in Steels

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 6, pp 897 - 902 (USSR)

ABSTRACT: This paper was presented at the Sixth All-Union Conference on Using X-rays for Investigating Material, held in June, 1958.

The authors investigated the intracrystalline structure of steel 45, containing 0.4% C, and of austenitic manganese steel, containing 0.4% C and 12% Mn, after quenching from temperatures between 600 and 1 200 °C and tempering at temperatures of 200 - 700 °C. They consider the problem of selection of a standard in determining the dimensions of blocks and type II distortions in the material. The authors propose application of the method of determination of the density of dislocations from the widening of the lines on X-ray patterns for the purpose of investigating processes taking place during heat treatment. As a result

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Investigation of the State of the Crystal Lattice and of the Density of Dislocations in the Case of Phase Transformations in Steels

of the experiments, data were obtained on the changes in the density of dislocations in the austenite and in ferrite during quenching and tempering of the steels. The authors propose a probable dislocation mechanism of the processes taking place in α and γ phases during quenching and tempering of steels: during quenching of steel a large number of point defects and dislocations occur in the α phase during γ-α transformation, which are concentrated at the block boundaries and distributed inside the block, i.e. distorting the lattice; increase of the number and the extent of such dislocations inside the block will bring about an increase in "type II" distortions, whilst an increase in the number of closed chains (relaxed defects) will correspond to an increase of the degree of dispersion of the blocks. Thus, the density of the dislocations characterises both the block dimensions and the type II distortions. In the case of quenching of steels with a mixed $\gamma + \alpha$ structure, the

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S/126/60/009/06/014/025
E073/E335

Investigation of the State of the Crystal Lattice and of the Density of Dislocations in the Case of Phase Transformations in Steels

mechanism of these processes changes to some extent. There are 5 figures and 11 references, 9 of which are Soviet and 2 English.

ASSOCIATION: Moskovskiy institut stali im. I.V. Stalina
(Moscow Steel Institute imeni I.V. Stalin)

SUBMITTED: July 25, 1959

Card 3/3

S/020/60/132/01/28/064
B014/B014

AUTHORS: Kalikhman, V.L., Umanskiy, Ya.S.

TITLE: Investigation of the Initial Stages of the Formation of Diffusion Porosity in the Alloys L62 and N80Kh20 by Using the Method of Small-angle Scattering of X-Rays

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 1, pp. 108-109

TEXT: The formation of porosity by elimination of the volatile component of alloys was studied in a vacuum chamber by using O. Kratky's method (Ref. 4). As a result of the elimination of zinc, the samples of the L62 alloy were in an atmosphere saturated with zinc when they were annealed at 750°. Similarly, the samples of the alloy of the type N80Kh20 were in an atmosphere saturated with chromium when they were annealed at 1200°. The results and the X-ray pictures shown in Fig. 2 are discussed. From the results obtained it follows that the pores begin to form on the surface of impurities. First, thin cracks are produced, which expand along the surface of the impurities. These results agree with the fact that the tendency to form pores is closely connected with

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Investigation of the Initial Stages of the Formation of Diffusion Porosity in the Alloys L62 and N80Kh20 by Using the Method of Small-angle Scattering of X-Rays

S/020/60/132/01/28/064
B014/B014

the amount of impurities. There are 2 figures and 6 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy institut stali im. I.V. Stalina (Moscow Steel Institute imeni I.V.Stalin)

PRESENTED: December 29, 1959, by G.V. Kurdyumov, Academician

SUBMITTED: December 28, 1959

Card 2/2

S/020/60/132/02/22/067
B014/B007

18.8100

AUTHORS: Kagan, A.S., Umanskiy, Ya.S.

TITLE: The Anomalies of the Thermal Factor of the Scattering of X-Rays by Ni - Cr, Cu - Zn and Ni - V Alloys

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 2, pp. 326-328

TEXT: In the introduction the authors refer to the assumption of the Debye-distribution of thermal waves according to frequency, which was made when determining the characteristic temperature. The actual spectrum in all cases deviates more or less considerably from this assumption. In the present paper the results obtained by investigations on a nickel-chrome alloy with 21% Cr, on α-brass with 31.6% Zn, and on a nickel-alloy with 8% V are given. The X-ray diffraction studies were carried out by means of CuKα-emission; determination of the characteristic temperature by means of the modulus of elasticity carried out according to a method previously described by the authors (Ref. 16). The investigations on the nickel-chrome alloy were carried out both on samples, which were in the K-state and on such in which there was no K-state. Investi-

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gation of the Cu-Zn-alloy was carried out both on samples which had a regular lattice and on samples with a disordered lattice. The pre-treatments of the samples are briefly discussed, and measuring results are shown in the diagrams of Figs. 1-3, in which the dependence of the logarithm of relative intensity on temperature is graphically represented. In tables 1-3 the calculated characteristic temperatures are given. It is found that the characteristic temperature of the samples determined in two ways differs, and besides, the characteristic temperature determined by means of X-ray diffraction study in the temperature range of liquid nitrogen up to room temperature and in the temperature range from room temperature up to higher temperature differs. Only for brass in the ordered state is this difference near the measured error. When discussing the results obtained, the authors point out the fact that in high-temperature measurements it is not the shape of the spectrum but the maximum frequency that exerts an influence upon the thermal factor. The causes of the anomalies of the thermal factor must be explained by investigations of the diffuse scattering on monocrystals. The authors thank Yu.A. Rymashevskiy for his assistance in measuring the moduli of elasticity. There are 3 figures, 3 tables, and 18 references, 7 of which are Soviet.

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8047B

The Anomalies of the Thermal Factor of the Scattering of X-Rays by Ni - Cr, Cu - Zn and Ni - V Alloys

S/020/60/132/02/22/067
B014/B007

ASSOCIATION: Moskovskiy institut stali im. I.V. Stalina (Moscow Steel Institute imeni I.V. Stalin)

PRESENTED: December 29, 1959, by N.V. Belov, Academician

SUBMITTED: December 26, 1959

4

Card 3/3

83560

S/020/60/134/001/012/021
B004/B060

9.4340

AUTHORS: Bogorodskiy, O. V., Umanskiy, Ya. S., Shil'shteyn, S. Sh.

TITLE: On the Nature of the Mosaic Structure of Single Crystals of Germanium and Silicon

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 134, No. 1, pp. 114 - 116

TEXT: The authors wanted to check the dislocation character of the mosaic structure (Fig. 1), and studied single crystals of germanium and silicon that were drawn from the melt along the (111)-axis. The samples used were 2-3 mm thick foils cut perpendicular to the (111)-axis. It was established by etching that almost all of the dislocations exhibited the Burgers vector a/2 (1$\bar{1}$0). In some cases, the authors observed lines which corresponded to small-angle boundaries. The density of surface dislocations was 10^2 - 10^6 cm^{-2} for germanium, 10^2 - 10^3 cm^{-2} for silicon. The principle of the X-ray analysis is described (Fig. 2). The monochromatic X-ray beam is reflected from the crystal I, and hits on crystal II which is rotated around small angles. The authors used the

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On the Nature of the Mosaic Structure of Single Crystals of Germanium and Silicon

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B004/B060

УРС-50И (URS-50I) apparatus with Geiger counter. The curve of the intensity of double reflection of I as a function of the angle of rotation β is defined as rotation curve. The authors constructed a special goniometer head which allowed rotations around small angles with an accuracy of 0.5". The rotation curves obtained experimentally are shown in Fig.3, the data are given in Table 1. The distances between the maxima equal the disorientation angle of the crystal blocks. Experimental data show that the Ge single crystals have a mosaic structure with all dislocation densities, while the disorientation angles of the blocks change little, although the dislocation densities differ by four orders of magnitude. This cannot be explained by the Burgers model. In silicon, the blocks are considerably smaller, which likewise contradicts the Burgers model, since the lattice constants of Ge and Si are little different. The germanium crystals with small-angle boundary showed fragment structure. The authors arrived at the conclusion that the block boundaries in Ge and Si may be connected with dislocations, but not according to the mechanism of the small-angle boundary. Also structural defects might play a role here. The interfaces between the fragments, on the other hand, consist of dislocations in agreement with the

X

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83560

On the Nature of the Mosaic Structure of Single Crystals of Germanium and Silicon

S/020/60/134/001/012/021
B004/B060

Burgers model. Thus, the nature of the block- and fragment boundaries is different. There are 3 figures, 1 table, and 5 references: 2 Soviet, 1 US, and 1 German.

ASSOCIATION: Moskovskiy institut stali im. I. V. Stalina (Moscow Steel Institute imeni I. V. Stalin)

PRESENTED: April 26, 1960, by P. A. Rebinder, Academician

SUBMITTED: March 2, 1960

Card 3/3

GAL'PERIN, Ye.L. [translator]; UMANSKIY, Ya.S., red.; MARENKOV, Ye.A., red.; EL'KIND, L.M., red. izd-va; ATTOPOVICH, M.K., tekhn. red.

[Theory of phases in alloys; collection of articles on reports read at a conference on the theory of phases in alloys. Translated from the English] Teoriia faz v splavakh; sbornik statei po dokladam, prochitannym na seminare po teorii faz v splavakh. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1961. 353 p. (MIRA 14:12)

(Phase rule and equilibrium) (Alloys--Metallography)

MIRKIN, Lev Iosifovich; UMANSKIY, Ya.S., prof., red.; GOL'DER, G.A., red.; MAKAROV, Ye.F., red.; MURASHOVA, N.Ya., tekhn. red.; TUMARKINA, N.A., tekhn. red.

[Manual on X-ray diffraction analysis of polycrystals] Spravochnik po rentgenostrukturnomu analizu polikristallov. Pod red. IA.S.Umanskogo. Moskva, Gos. izd-vo fiziko-matem. lit-ry, 1961. 863 p. (MIRA 14:8)
(X-ray crystallography)

S/139/61/000/004/018/023
E021/E480

AUTHORS: Kalikhman, V.L. and Umanskiy, Ya.S.

TITLE: X-Ray measurement of total sub-microporosity and of pore size, arising during the mutual diffusion of copper and nickel

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Fizika, no.4, 1961, 140-145

TEXT: Studies were carried out on the increase in sub-microporosity during the process of mutual diffusion of copper and nickel, using the apparatus for recording low-angle reflections with a slit arrangement proposed by O.Kratky (Ref.2. Kolloid-Zeitschrift, 144, 110, 1955) with slight modifications. Samples were prepared in the following way: 10 micron thick nickel foil was annealed for 2 hours at 1000°C and placed between two sheets of 20 micron thick copper foil. The surface of the foil was electropolished and washed in acetone. The sandwich was clamped and heated in vacuo at 900°C for 15 minutes. This was sufficient for diffusion welding to take place. Diffusion treatment was carried out at 1000°C for 5 to 160 minutes and at 900°C for 15 to 240 minutes in vacuo. The samples were then radiographed. Low angle

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X-Ray measurement of total ...

reflections were obtained from the samples before and after heating. The low angle effect was caused by imperfections of the foil surface, as shown by its increase with an increasing number of foil layers. The low angle reflections were 3 to 4 times more intense after sintering, being 2 x 10^{-3} of the intensity of the initial beam. Thus, the effect must be caused, in the main, by submicropores formed as a result of the difference in partial coefficients of diffusion of the sintered metals. Generation of pores had already started even after 15 minutes at 900°C. The minimum size of pore was about 300 A after this time. Obviously, this must have been close to the critical size for nucleation. With increasing time, the pore size increased because of coagulation of pores. The process of increase in pore size, in the initial stages, was obviously autocatalytic. The total volume of submicroscopic porosity was of the order of 10^{-3} of the volume of the sample. S.T Konobeyevskiy is mentioned in the article. There are 4 figures and 9 references: 3 Soviet and 6 non-Soviet. The four references to English language publications read as follows: Ref.4 A. Guinier, G. Fournett. Small-angle scattering of X rays. London, 1955.

Card 2/3

X-Ray measurement of total ...

Ref.5P A. Guinier. J. of Appl. Phys., 30, No.5, 1959;
Ref.7: W.T.Ogier, R.L.Wild, J.C.Nickel. J. of Appl. Phys., No.3. 1959; Ref.8: R.H.Neyamber, W.G.Brammer, W.W.Beeman. J. of Appl. Phys., No.5, 1955.

ASSOCIATION: Moskovskiy institut stali imeni I.V.Stalina
(Moscow Steel Institute imeni I.V.Stalin)

SUBMITTED: July 4, 1960

Card 3/3

S/129/61/000/007/014/016
E073/E535

11600

AUTHORS: Astrakhantsev, S.M., Gromova, S.P., Kalikhman, V.L. and Umanskiy, Ya. S.

TITLE: Influence of Diffusion Porosity in a Nichrome Alloy on the Sintering of Nickel and Chromium Powders

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1961, No.7, pp.52-54

TEXT: In studying the process of sintering of nickel and chromium the authors discovered some unusual changes of the lattice period and the shape of the lines on X-ray diffraction patterns of the nichrome Kh20N80 (Kh20x80). For the investigations, specimens of various densities (porosities 10-15, 25-30 and 40-45%) were prepared by cold pressing. The specimens were sintered in a hydrogen stream at 1150°C for 8 hours. X-ray diffraction patterns were made using a molybdenum reference standard with copper radiation. The lattice period was calculated from the line (420). It was found that during sintering the lattice period did not change monotonously but in jumps. Fig.1 shows the dependence of the lattice period, Å, of sintered

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nichrome on the sintering time, hours, for the following initial periods: curve 1 - 15-20%, curve 2 - 30%, curve 3 - 40-45%. During the first three hours of sintering, the maxima and minima of the lattice periods did not coincide for specimens with various porosities; however, during the later stages of sintering they are synchronous for all the specimens. There is a similar change in the blurring of the lines on the X-ray diffraction patterns: the lines are blurred or sharp right up to the division of the K_{α} doublet. The sharp lines correspond to larger lattice periods. Similar phenomena were observed by S. S. Gorelik (Ref.1: Nauchnyye doklady vysshey shkoly, Metallurgiya, No.2, 1959) during sintering of Cunico alloy. These phenomena indicate that sintering of nickel and chromium powders does not change monotonously the uniformity of the solid solution. This can be explained on the basis of results of the study of the formation and growth of sub-microporosities in the nichrome alloy. Porosity was observed in an alloy of a similar composition (21% Cr) during the distillation of chromium in vacuum at various temperatures. The dimensions of the sub-micropores were determined by studying the low angle scattering of X-rays. Fig.2 shows the test-rig

used for studying the low angle scattering (1 - X-ray tube, 2 - monochromator, 3 - specimen, 4 - collimator, 5 - Geiger-Muller counter, 6 - counting circuit). It was found that sub-microscopic pores of a size of several hundred Angstrom form in the nichrome during the process of evaporation of chromium. Fig.3 shows the dependence of the average pore dimensions, $\bar{R}_o$, Å, and of the total porosity (loss in weight), ΔP, mg, in nichrome subjected to vacuum evaporation at various temperatures as a function of time, $\sqrt{\tau}$, min for the sintering temperatures 1200°C (plot a) and 1350°C (plot b). The dimensions of the sub-micropores also did not change monotonously; the lower the evaporation temperature the larger will be the number of extremal points on the curve $R_o = f(\sqrt{\tau})$. The observed phenomenon can be explained only by the healing of the formed sub-micropores, since the maximum dimension of the pores was considerably below 1000 Å. Healing proceeds as a result of chromium diffusion; its partial diffusion coefficient in nichrome is considerably higher than the diffusion coefficient of nickel (Ref.4: S. Dashman: "Scientific fundamentals of vacuum engineering", Russian translation, 1950).

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Influence of Diffusion Porosity ... S/129/61/000/007/014/016
E073/E535

In this case healing is possible if the flow of chromium atoms to the pore is larger than the flow of vacancies. After the pores have healed, sections will remain which are chromium enriched and the internal flow of vacancies will cease. The appearance of concentration non-uniformities leads to blurring of the lines on the X-ray pattern and to a reduction of the lattice period. By means of low angle scattering it is also possible to detect the decrease in the pore dimensions. Then, the chromium concentration begins to equalize in the alloy and the concentration of vacancies will increase; this produces a narrowing of the lines on the Debye pattern. An increase in the concentration of the vacancies leads to the formation of new and growth of remaining pores. The concentration of vacancies will decrease in jumps and the process of healing of the pores will start afresh. This process appears to continue until a certain quantity of chromium is evaporated from the alloy. There are 3 figures and 4 references: 3 Soviet and 1 a Russian translation.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

Card 4/6

KALIKHMAN, V.L.; UMANSKIY, Ya.S.

Determining the orientation of the diffusion submicropores in α-brass by the method of small-angle scattering of X rays. Fiz. tver. tela 3 no.2:331-335 F '61. (MIRA 14:6)

1. Institut stali, Moskva.
(Diffusion)
(X rays—Industrial applications)

KAGAN, A.S.; UMANSKIY, Ya.S.

Relation between the X-ray characteristic temperature and the spectrum of elastic vibrations. Fiz. tver. tela 3 no.9: 2683-2687 S '61. (MIRA 14:9)

1. Moskovskiy institut stali imeni I.V. Stalina.
(Crystals) (X-rays)

ASTRAKHANTSEV, S.M.; MOZZHUKHIN, Ye., I.; UMANSKIY, Ya.S.

Investigation of sintered alloys on the basis of NiAl metallic compounds. Izv. vys. ucheb. zav.; tsvet. met.4 no.2:110-115 '61. (MIRA 14:6)

1. Moskovskiy institut stali, kafedra rentgenografii.
(Nickel-aluminum alloys—Testing)
(Powder metallurgy)

S/126/61/011/002/023/025
E073/E335

AUTHORS: Kalikhman, V.L., Umanskiy, Ya.S. and Chirikov, N.V.

TITLE: Study of the Diffusion Porosity Occurring During Distillation of Chromium From Single Crystals of the Alloy ЭИ437Б (EI437B)

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol. 11, No. 2, pp. 314 - 316

TEXT: As shown in other work by the authors (to be published in Metallovedeniye i termicheskaya obrabotka metallov) diffusion porosity occurs during distillation of chromium from the alloy Х20Н80 (Kh20N80), whereby the pores are equally oriented within the limits of 1 grain. By means of a method described in an earlier paper (Ref. 3), the authors attempted to determine the orientation of the pores in the initial stages of their growth with respect to the crystal lattice of the alloy. Since they did not manage to grow sufficiently large crystals of the alloy Kh20N80 by recrystallisation, the authors used large crystals obtained accidentally in scrap material from the alloy EI437B, the composition of which is similar to that of

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S/126/61/011/002/023/025
E073/E335

Study of ....

Kh20N80. The single-crystal film which is required for investigating the pores by the method of small-angle X-ray scattering was obtained by mechanical grinding to a thickness of 150 μ, followed by electropolishing to a thickness of 60 μ. The electrolytic thickness-reduction did not ensure total removal of the work-hardened layer and the Laue pattern is blurred (Fig. 1 - pertaining to a single-crystal film of the alloy EI437B, the surface plane of which is near to the plane (100)).However, specimens produced from thicker sheet by electrolytic polishing were considerably nonuniform as regards thickness. The Cr distillation was effected in a quartz ampule (which was connected continuously to a pre-vacuum pump) at 1 330 °C for 2.5 hours. Shorter distillation times did not produce porosities. After terminating the distillation process, the specimen was rapidly thrown into the cooled part of the ampule to eliminate falling-out of the ordered phase. Some of the specimens crystallised during distillation and broke up into a number of small grains, whilst others remained single crystals. Curves of the drop in intensity of

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Study of ....

the small-angle scattering as a function of the distance from the edge of the primary beam were plotted by photometering the X-ray diffraction patterns which were obtained by means of slot equipment built as described by Kratky (Ref. 4). The slot was located in differing crystallographic directions. Specimens were investigated, the surfaces of which were near to the plane (111) and (100) . The photometric curves were standardised in such a way that the intensities at a distance of 1' from the edge of the primary beam were equal for all the X-ray diffraction patterns taken from the same specimen. Following that, lines of equal intensity were plotted in the polar coordinates (angles-intensity). The thus obtained graphs are plotted in Figs. 2a and b (curves of equal intensity of low-angle scattering in various directions: Fig 2a. - specimen surface near to the plane (111), 1, 2, 3, ...8 min; Fig. 2b - specimen surface near to the plane (100), 1, 2, 3, ...6 min). It can be seen that the intensity of low-angle scattering of X-rays drops more slowly for a specimen, the surface plane of which is near to the plane (111) if the

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Study of ....

slot is in the direction {211} (corresponding to the photometering direction {110}). This means that in the direction {110} the dimension of the pore nucleus is at a minimum (Ref. 3). The anisotropy of the drop in intensity for specimens with the surface plane near to the plane (100) confirms these conclusions. It is pointed out that the anisotropy of low-angle scattering for the alloy EI437B is not as pronounced as it is for brass. This is attributed to the fact that the alloy is strongly contaminated with nonmetallic inclusions with irregular boundaries, which can be clearly seen in unetched polished cuts. They can serve as a basis for forming arbitrarily oriented pores.
There are 2 figures and 4 Soviet references.

ASSOCIATION: Moskovskiy institut stali im. I.V. Stalina
(Moscow Institute of Steel im. I.V. Stalin)

SUBMITTED: September 8, 1960

Card 4/6

UMANSKIY, Ya.S.

Present-day problems in the x-ray study materials. Zav.lab. 27 no.6:635-637 '61. (MIRA 14:6)

(Materials--Testing)
(X rays--industrial applications)

KALIKHMAN, V.L.; UMANSKIY, Ya.S.

Application of the method of small-angle scattering of x rays in the study of submicroscopic inhomogeneities in materials; survey. Zav.lab. 27 no.6:691-698 '61. (MIRA 14:6)

(X rays--Industrial applications)
(Materials--Testing)

S/659/62/008/000/018/028
I048/I248

AUTHORS: Kalikhman, V.L., Umanskiy, Ya.S., and Chirikov, N.V.

TITLE: A study of the appearance and growth of diffusion porosity during the evaporation of the volatile component from some nickel-based alloys

SOURCE: Akademiya nauk SSSR. Institut metallurgii, Issledovaniya po zharoprochnym splavam. v.8. 1962. 127-131

TEXT: Equations for calculating the size and amount of submicro diffusion pores in metals and alloys from small-angle x-ray scattering data are derived. These equations were used to calculate the diffusion porosity of Ni-26.9% Mn and Ni - 27.6% Zn alloys. The alloy specimens (foil 30 microns thick) were heated in vacuo to 800-1100°C to evaporate the more volatile component. The pore size increased at first with increasing time at the elevated temperature, reached a maximum and decreased thereafter. The pores could be classified into two groups according to size; the maximum sizes are 400 angstrom in the first and 1500 angstrom in the second group.

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S/659/62/008/000/018/028
I048/I248

A study of the appearance and growth...

It is assumed that the growth of the pores is an autocatalytic process during the first stages of evaporation; the rate of growth decreases with time during to the exhaustion of the vacancy sources within the alloy. The fraction of diffusion porosity in the total porosity amounts to 18-20% in the specimens subjected to evaporation at 800°C and decreases with both time and increasing temperature. There are 4 figures.

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S/181/62/004/006/011/051
B125/B104

AUTHORS: Semenovskaya, S. V., and Umanskiy, Ya. S.

TITLE: Radiographic determination of Focht's elastic constants and the transverse branches of the phonon spectrum for disordered substitution solid solutions with cubic structure

PERIODICAL: Fizika tverdogo tela, v. 4, no. 6, 1962, 1455 - 1465

TEXT: Focht's constants and the transverse branches of the phonon spectrum for disordered substitution solid solutions (8 at% Al in Cu) with cubic structure (face-centered, body-centered, or simply cubic) were determined by an isothermal method. After measuring the absolute intensity of the diffuse X-ray scattering for small wave vectors $|\vec{k}|$ (that means, when the classical theory of elasticity can be applied), one obtains the frequency of the transverse branches of the phonon spectrum by using the formula for the intensity of thermal diffuse single-phonon scattering. The velocities of sound $c_o^{(s)}$ in the different directions are obtained from four diffusion equations (two transverse branches for $\vec{k}$ along $\{110\}$ and one

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S/181/62/004/006/011/051
B125/B104

Radiographic determination of...

transverse branch each for $\vec{k}$ along $\{100\}$ and $\{111\}$). The elastic constants c_{11}, c_{12}, and c_{44} are calculated from the values of $c_o^{(s)}$. To obtain the ratio between the elastic constants it is sufficient to determine three ratios of diffuse scattering intensities around a $[110]$ reflex in the directions $[001]$, $[1\bar{1}0]$, and $[1\bar{1}1]$. The determination of the absolute value for the constants of elasticity also requires a knowledge of the absolute value of one of the isotropic macroscopic moduli (Young's modulus, shear modulus, or compressibility). To obtain the transverse branch of the phonon spectrum for a wave vector directed along $\{100\}$, $\{110\}$, and $\{111\}$ it is necessary to measure the intensity of diffuse scattering around the (200) reflex in the directions $[100]$, $[010]$, and $[011]$, around the (220) reflex in the directions $[110]$, $[1\bar{1}0]$, and $[1\bar{1}1]$, and around the (111) reflex in the directions $[111]$. There is 1 figure.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: January 8, 1962

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35596
S/048/62/026/003/004/015
B107/B102

IP.1152

AUTHORS: Ol'shanskaya, E. Ya., Nekrasov, Yu. V., and Umanskiy, Ya. S.

TITLE: Examination of order in the alloy W + 44 atom% Mo by measuring the diffuse X-ray scattering

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 3, 1962, 349-351

TEXT: The degree of order in the alloy W + 44% Mo at 1100, 1350, and 1700°C was studied. A УРС-50И (URS-50I) diffractometer and CuK_α radiation monochromatized by a plane germanium crystal, were used for the examination. Radiation was recorded with an МСТР-4 (MSTR-4) argon counter. The angular range from 8 to 20° was measured; scattering from air was eliminated by the use of a vacuum chamber (Ref. 1: A. S. Kagan, V. A. Somenkov, Ya. S. Umanskiy, Kristallografiya, 5, 468 (1960)). Temperature effect, Compton effect, and Bragg scattering were mathematically eliminated. Ground samples with etched surfaces were used for the examination, since absorption was considerable. The intensity distribution was determined experimentally. The curve for 1700°C was calculated from

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Examination of order in the ...

$$I = Nc_A c_B (f_B - f_A)^2 \sum_i \alpha_i \frac{\sin Sr_i}{Sr_i}.$$

The short-range order coefficients α_i resulting from it, are given numerically. The positive signs of α_1 and α_2 show the atoms of the same type to prevail in the neighborhood of one atom, i.e. the Mo - W system tends to segregate. Furthermore, the radial distribution of the atom density of tungsten was determined from the formula

$$f(r) = \frac{2r^2}{\pi} \sum_i S^2 \varphi(S) \frac{\sin Sr}{Sr} \Delta S.$$

In general, the results of Fig. 2 agree with those of the first method. The additional minimum between r_3 and r_4 is explained by the fact that the upper limit of integration, S_0, is 2.6 instead of ∞ (Ref. 4, see below). The degree of order increases slightly as temperature decreases, but still is very low at all temperatures. The mixing energy appears to be very low: it is 0.079 ev for 1700°C according to Ref. 5 (M. A. Krivoglaz, A. A.

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Examination of order in the ...

Smirnov, Teoriya uporyadochivayushchikhsya splavov (Theory of ordering of alloys), M., 1958). There are 2 figures, 1 table, and 5 references: 3 Soviet and 2 non-Soviet. The two English-language references are:
Ref. 3: P. S. Rudman, B. L. Averbach, Acta metallurg., 2, 575 (1954);
Ref. 4: P. A. Flinn, B. L., Averbach, P. S. Rudman, Acta crystallogr., 7, 153 (1954).

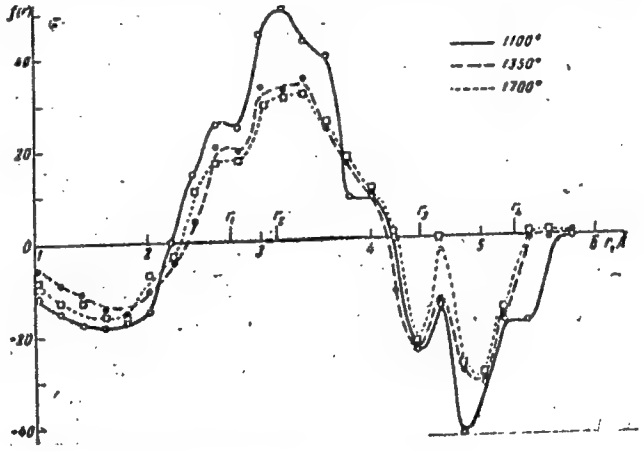

Fig. 2: Curves of radial distribution of the atom density of W, (a tungsten atom in the sphere center).

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S/048/62/026/003/005/015
B107/B102

AUTHORS: Vishnyakov, Ya. D., and Umanskiy, Ya. S.

TITLE: Formation of packing defects in alloys during the distillation of the volatile component

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 3, 1962, 352-353

TEXT: Zinc was distilled from a silver - zinc alloy with a face-centered cubic lattice (~ 10% by weight of Zn) at 600-650°C and 10^{-4} mm Hg. The 0.08 mm thick plates were cooled in air. A standard sample was cooled to room temperature within 12 hrs in a furnace. The reflection patterns ((111) and (200)) were recorded with a УРС-50И (URS-50I) diffractometer and CuK_α emission. The distance between the two reflexes from the standard was by α_4' larger than that from the chilled sample. This is probably due to packing defects. Since distillation changes the lattice constant, the ratio $\sin\vartheta_{200}/\sin\vartheta_{111}$ (sines of the reflection angles) which is independent of the lattice constant, is suggested for quantitative characterization of lattice defects. In packing defects in a face-centered cubic lattice, (200)

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Formation of packing defects ...

is displaced toward smaller, and (111) toward wider angles. The sine ratio decreases by 0.026, whereas the greatest possible error in the determination of this ratio is 0.015. Two competing processes of defect concentrations in the alloys are assumed to occur, since in some papers (Ref. 4: V. L. Kalikhman, Ya. S. Umanskiy, N. V. Chirikov, Fizika metallov i metallovedeniy, 11, no. 2, 314 (1961)) channels with a (110) orientation were found to appear when the volatile component is distilled off. The results of the present paper show a concentration of defects in the (111) plane. The two English-language references are: W. T. Read, Dislocations in crystals, C. N. J., Wagner, metallurg., 5, 427 (1957).

Card 2/2

39585
S/020/62/145/002/009/018
B178/B104

24.7300

AUTHORS: Semenovskaya, S. V., and Umanskiy, Ya. S.

TITLE: Separate determination of dynamic and static distortions from weakening of the interference maxima of solid solutions in any phonon spectrum

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 145, no. 2, 1962, 312-314

TEXT: When solid solutions are formed or are thermally treated, their interference maxima are weakened by a change in the mean square displacement of the elastic atomic vibrations and by a static displacement of atoms:

$$I = I_o \exp(-(L_{dyn} + L_{stat}));$$

$$L_{dyn} = \frac{16\pi^2 \sin^2\Theta}{3\lambda^2} \overline{u^2_{dyn}}; \quad L_{stat} = \frac{16\pi^2 \sin^2\Theta}{3\lambda^2} \overline{u^2_{stat}}$$

The quantities u^2_{dyn} and u^2_{stat} can be determined separately as u^2_{dyn} is temperature-dependent whereas u^2_{stat} is not. The quantity $\bar{u}^2_{dyn}$ is

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Separate determination of dynamic...

determined by

$$\overline{u^2_{\text{stat}}} = \frac{\hbar}{m}\int_0^\infty \left(\frac{1}{e^{\hbar\omega/kT}-1}+\frac{1}{2}\right)\frac{g(\omega)}{\omega}\,d\omega, \qquad (1),$$

where m is the effective atomic mass of the solid solution $\left(\frac{1}{m} = \frac{c_1}{m_1} + \frac{c_2}{m_2}\right)$; $g(\omega)d\omega$ is the number of vibrations of frequency ω; $\int_0^\infty g(\omega)d\omega = 3$. When $\hbar\omega/kT < 2\pi$, the function $\left(\frac{\hbar\omega}{kT}\right)/e^{\hbar\omega/kT}$ can be expanded in a Taylor series

$$\frac{\hbar\omega/kT}{e^{\hbar\omega/kT}-1} = 1 - \frac{1}{2}\frac{\hbar\omega}{kT} + \frac{1}{12}\left(\frac{\hbar\omega}{kT}\right)^2 - \frac{1}{720}\left(\frac{\hbar\omega}{kT}\right)^4 + \ldots \qquad (3).$$

Substitution furnishes the expression

$$\overline{u^2_{\text{stat}}} = \frac{kT}{m}\int_0^\infty \frac{g(\omega)}{\omega^2}\,d\omega + \frac{\hbar^2}{4mkT}. \qquad (4).$$

Then the mean square displacement is $\bar{u}^2_{\text{tot}} = \bar{u}^2_{\text{dyn}} + \bar{u}^2_{\text{stat}} = A\frac{kT}{m} + \frac{\hbar^2}{4mkT} + \bar{u}^2_{\text{stat}}$,

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Separate determination of dynamic...

where $A = \int_0^\infty \frac{g(\omega)}{\omega^2} d\omega$ is temperature-independent. The static and thermal displacements are determined graphically. The inclination of the resultant straight line determines $A\frac{k}{m}$. The quantity $\bar{u}^2_{tot}$ can be found only by experiment and is temperature-dependent only at high temperatures. Below room temperature the term $\hbar^2/4mkT$ has to be calculated since otherwise the error is 5 % even at room temperature. There is 1 table.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: January 23, 1962

Card 3/3

UMANSKIY, Ya.S.

Certain characteristics of the atomic structure of solid solutions. Issl. splav. tsvet. met. no.4:48-56 '63. (MIRA 16:8)

(Solutions, Solid) (Crystal lattices)

VISHNYAKOV, Ya.D.; UMANSKIY, Ya.S.

Effect of packing defects on the position of the (301) line in an X-ray photograph of a metal with a face-centered cubic lattice. Kristallografiia 8 no.2:273-275 Mr-Ap '63. (MIRA 17:8)

1. Moskovskiy institut stali.

BARSUKOV, V.N.; VISHNYAKOV, Ya.D.; UMANSKIY, Ya.S.

Characteristics of the fine crystal structure of titanium following cold straining. Metalloved. i term. obr. met. no.11:48 N '63. (MIRA 16:11)

1. Moskovskiy institut stali i splavov.

VISHNYAKOV, Ya.D.; MAZO, D.M.; UMANSKIY, Ya.S.

Defects of packing in pure cobalt and in cobalt-iron alloys.
Izv. vys. ucheb. zav.; chern. met. 6 no.9:145-147 '63.
(MIRA 16:11)

1. Moskovskiy institut stali i splavov.

UMANSKIY, Ya.S.; CHIRIKOV, N.V.

Correction for the divergence in small-angle X-ray scattering. Fiz. met. i metalloved. 16 no.3:480-481 S '63. (MIRA 16:11)

1. Moskovskiy institut stali i splavov.

VISHNYAKOV, Ya.D.; UMANSKIY, Ya.S.

Occurrence of oriented porosities in metal during hardening. Fiz. met. i metalloved. 16 no.4:632-634 O '63. (MIRA 16:12)

1. Moskovskiy institut stali i splavov.

VARLI, K. V.; SKAKOV, Yu. A.; UMANSKIY, Ya. S.

"Some morphological peculiarities of decomposition of supersaturated solid solutions in copper-base alloys."

report submitted for 3rd European Regional Conf, Electron Microscopy, Prague, 26 Aug-3 Sep 64.

ACCESSION NR: AP4028437 S/0181/64/006/004/1100/1103

AUTHORS: Semenovskaya, S. V.; Umanskiy, Ya. S.; Puzey, I. M.; Granovskiy, Ye. B.

TITLE: Investigating the phonon spectrum of nickel by diffuse scattering of x rays

SOURCE: Fizika tverdogo tela, v. 6, no. 4, 1964, 1100-1103

TOPIC TAGS: phonon, nickel, diffuse scattering, x ray, elastic wave, sound velocity, elastic constant, ferromagnetic property, multiphonon scattering, goniometer RKSO, ionizer URS 50 IM, counter MST 17

ABSTRACT: The authors determined the dependence of frequency on the wave vector for longitudinal and transverse waves propagated along the symmetry directions—[100], [110], and [111] at room temperature. The initial segments of the dispersion curves permit approximate determination of the velocity of sound. The velocities thus obtained agree with average values determined ultrasonically within 7% or less. The computed values of the elastic constants (in dynes/cm^2)—$2.45 \cdot 10^{-12}$ for c_{11}, $1.6 \cdot 10^{-12}$ for c_{12}, and $1.14 \cdot 10^{-12}$ for c_{44}—are in good agreement with data from the literature. The dispersion in Ni is found to be much

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ACCESSION NR: AP4028437

greater than in Al and Cu, as reported in the literature. This fact apparently derives from the ferromagnetic nature of Ni and is due to spin-phonon interaction. The authors note that the precision in measuring the phonon spectrum is related to the precision in determining multiphonon scattering, and they point out some sources of error in applying corrections for multiphonon scattering. The corrections have a higher degree of validity for Al than for Ni. Orig. art. has: 3 figures and 2 tables.

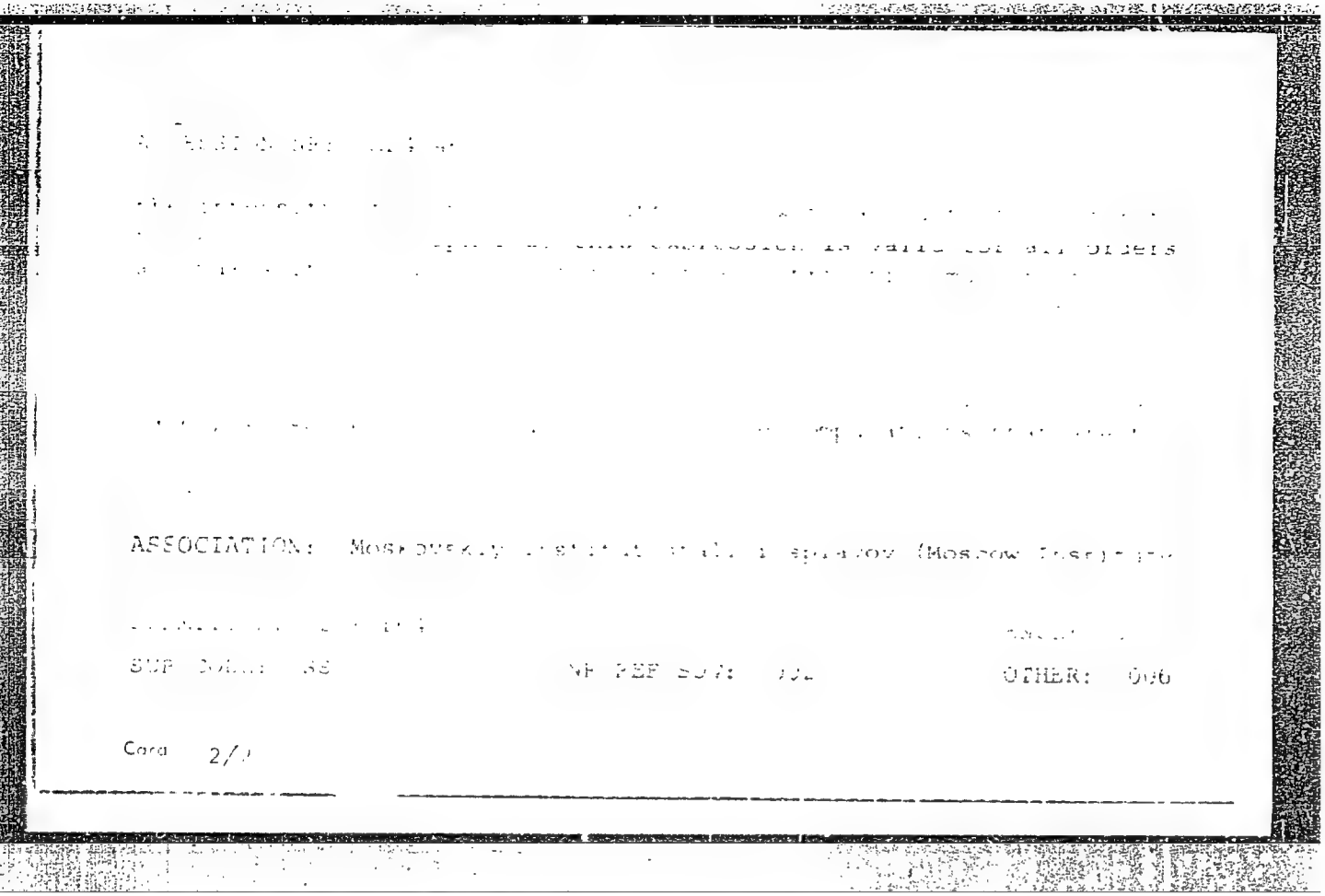
ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 23Oct63	DATE ACQ: 27Apr64	ENCL: 00
SUB CODE: SS,MM	NO REF SOV: 001	OTHER: 010

Card 2/2

ABSTRACT: In view of the [illegible] when the role of many phonon processes cannot be neglected, for example in the case of substances having a low characteristic temperature and low atomic mass, or in the case of [illegible] the form of [illegible] of separating from the [illegible] by centrifuge separation the [illegible]

Card 1/2



ASSOCIATION:

OTHER: 006

Copy 2/2

VISHNYAKOV, Ya.D.; UMANSKIY, Ya.S.

Characteristics of the dislocation structure in alpha-iron and iron ÷ 50 % cobalt alloys. Izv. vys. ucheb. zav.; chern. met. 7 no.1:145-147 '64. (MIRA 17:2)

1. Moskovskiy institut stali i splavov.

ACCESSION NR: AP4044140 S/0129/64/000/008/0041/0044

AUTHOR: Al'tman, A. B.; Gusev, V. Ya.; Kalikhman, V. L.; Umanskiy, Ya. S.

TITLE: Investigation of magnetosolid Mn-Al cast alloys

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 8, 1964, 41-44

TOPIC TAGS: manganese aluminum alloy, aluminum containing alloy, alloy magnetization, cast alloy, permanent magnet, magnetic alloy, magnetic permeability

ABSTRACT: 30 x 10 x 10 mm and 50 x 15 x 15 mm rectangular and 6 x 20 mm cylindrical samples of an Mn - Al alloy containing 67.2-73.5% Mn were investigated using magnetic, x-ray and metallographic methods in an attempt to evaluate the ferromagnetic properties and possible use of alloys of this type in permanent magnets. The magnetic properties of the samples, premagnetized in a 10,000 e electromagnetic field, were measured on a regular ballistic testing device. X-ray pictures were taken in an 86-mm Debye chamber with chromium and iron emission. The microstructure of unetched and etched cross sections was studied with an optical microscope. All the magnetic samples were found to contain an α-phase with a tetragonal, ordered, space-centered structure with a- and c-periods of 2.77 and 3.57 kX, respectively. The phase composition was found to depend on alloy chemical composition, cooling rate and the mode of thermal treatment. An alloy, tempered at 400-500C for

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ACCESSION NR: AP4044140

less than 1 hr., was found to consist almost entirely of a ferromagnetic τ-phase. Most of the tested alloy samples showed magnetic properties immediately after casting, with H_c values ranging from 180 to 960 e in individual samples. The magnetic state was intensified by a hardening procedure in which samples, annealed at 1150-1180C in hydrogen for 0.5-1 hr., were cooled at a critical rate or quenched in oil or cold water and tempered at 450-600C. The principal magnetic data for thermally treated Mn-Al cast magnets are shown in the Enclosure. "I. M. Garina, Ye. Yu. Zel'tser, T. N. Korchebokova, G. I. Lasis and V. N. Sorokina participated in the tests." Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys); VNIIEM

SUBMITTED: 00 ENCLOSURE: 01 SUB CODE: MM, EM

NO REF SOV: 000 OTHER: 000

Card 2/3

ACCESSION NR: AP4044140

ENCLOSURE: 01

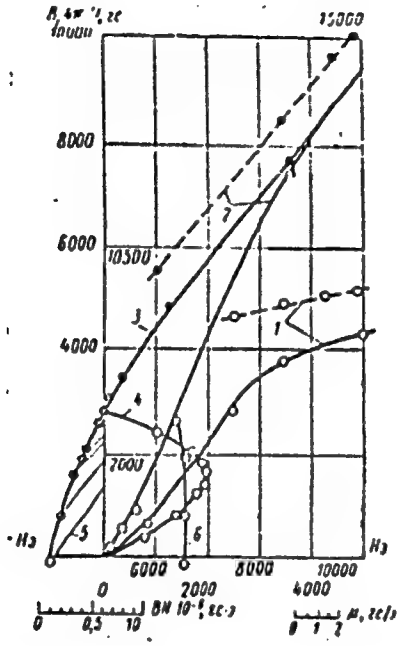

Fig. 1. Curves for: magnetization with respect to I (1) and B (2), demagnetization (3), magnetic energy (4), reversible magnetic permeability (5) and rehabilitation coefficient (6) of a Mn-Al alloy (71.6% Mn), plotted in two scales. Dashed lines refer to 6000-10,000-e fields.

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UMANSKIY, Ya.S.; CHIRIKOV, N.V.

Chromatic error for low-angle scattering of X rays. Fiz. met. i metalloved. 18 no.4:635-637 O '64. (MIRA 18:4)

1. Moskovskiy institut stali i splavov.

UMANSKIY, Ya.S.; CHIRIKOV, N.V.

Certain errors during the use of the small-angle scattering of X rays. Zav. lab. 30 no.11:1357-1360 '64 (MIRA 18:1)

1. Moskovskiy institut stali i splavov.

ACCESSION NR: AP4043837 S/0020/64/157/005/1103/1106

AUTHORS: Semenovskaya, S. V.; Umanskiy, Ya. S.

TITLE: Study of the phonon spectrum of a disordered solid solution with Ni_3Fe composition by the method of diffuse scattering of x rays

SOURCE: AN SSSR. Doklady*, v. 157, no. 5, 1964, 1103-1106

TOPIC TAGS: x ray diffraction, Compton scattering, phonon scattering, solid solution, nickel alloy, ordered alloy, single crystal

ABSTRACT: A method for separating the scattering intensities connected with static and thermal atom shifts, and permitting separation of scattering intensity by the transverse branches of the phonon spectrum in true form, was developed by the authors previously (FTT, v. 4, no. 6, 1455, 1962). This method is employed in the present research to investigate the phonon spectra in a disordered Ni_3Fe solid solution with stoichiometric composition, for which an x-ray

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ACCESSION NR: AP4043837

diffraction determination of the vibration frequencies in solid solution is possible. A single crystal was investigated, obtained by slow cooling from the melt. The method of preparing the sample is described. The investigation was made in a URS-50-IN ionization installation using cobalt-Kα emission, monochromatized by a cylindrical bent pentaerythrite crystal. The intensity of diffuse scattering was measured around the sites (200), (220) and (222) in the symmetry directions [100], [110], and [111]. The measured intensity was converted into absolute units by comparison with large-angle scattering from amorphous quartz. Corrections were made for Compton and two-phonon scattering, and for anomalous dispersion. The elastic constants of the single crystal of disordered Ni_3Fe solid solution, determined from the obtained spectrum, agree with each other within 5--7%, and have values C_{11} = 2.44, C_{12} = 1.6 and C_{44} = = 1.02 (all in units of 10^{12} dyne/cm^2). The singularities noted on the spectral curves are attributed to the influence of the near

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ACCESSION NR: AP4043837

order on the phonon spectrum. This report was presented by G. V. Kudryumov. Orig. art. has: 1 figure and 3 formulas.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

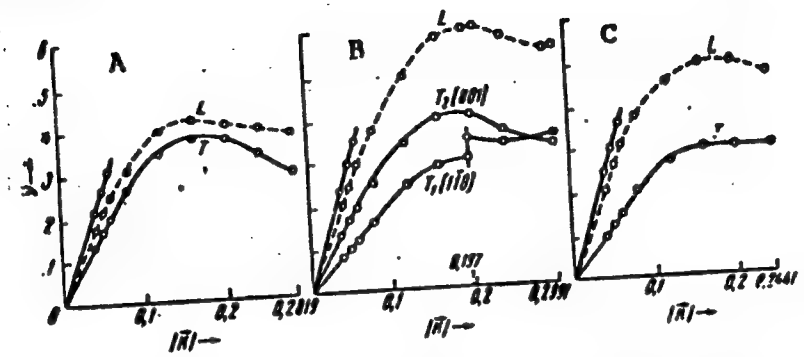
SUBMITTED: 26Mar64 ENCL: 01

SUB CODE: MP, MM NR REF SOV: 008 OTHER: 007

Card 3/4

ENCLOSURE: 01

ACCESSION NR: AP4043837



Dependence of the frequency ν (in 10^{12} sec^{-1}) on the wave vector k (in 10^8 kX) for longitudinal waves (L) without account of scattering by static inhomogeneities) and transverse waves (T): A - waves propagating along the [100] direction; B - waves propagating along the [110] direction (with polarizations [110] and [001]; C - waves propagating along the [111] direction.

Card 4/4

EWP(z)/EWA(c)/EWT(d)/EWP(b)/EWP(v)/EWP(w)/EWP(t) Pu-4

ACCESSION NR: AP5008[illegible]

AUTHOR: Umanskiy, Ya. S.; Fadeyeva, V. I.

TITLE: Diffusion scattering of x-rays by a solid solution of NbC-TaC

SOURCE: Fizika metallov [illegible] metal physical property

TOPIC [illegible]

ABSTRACT: A description [illegible] the diffusion scattering of x-rays by

Card 1/2

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

SUBMITTED: 18May64 ENCL: 00 SUB CODE: MM, OP

NO REF SOV: 002 OTHER: 003

Card 2/2

L 1628-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JW/JG

ACCESSION NR: AP5021945 UR/0126/65/020/002/0310/0313
620.183.48

AUTHOR: Umanskiy, Ya. S.; Chirikov, N. V.

TITLE: Concentration inhomogeneities in deformed copper-aluminum and copper-beryllium alloys

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 2, 1965, 310-313

TOPIC TAGS: concentration inhomogeneity, deformed alloy, dissolved atom segregation, small angle scattering, X ray scattering, scattering angle, activation energy, packing defect

ABSTRACT: Segregations of dissolved atoms form on packing defects in between extended partial dislocations; all the previous studies of this effect have been performed after deformation. Therefore, it was of interest to investigate the effect of deformation. In this connection, on the basis of the findings of Cahn and Davies (Phil.Mag., 1960, 5, 59, 1119), who investigated small-angle X-ray scattering for foil having the composition Cu + 15 at.% Al, deformed 70% and tempered at 200 and 250°C, the authors calculated the activation energies of the

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ACCESSION NR: AP5021945

formation of segregations. The calculations were based on the assumption that the segregations have roughly identical dimensions and that an equal intensity of small-angle X-ray scattering corresponds to their equal number, i.e. all the systems are in identical state. This assumption was verified for the alloy Cu + 2.4 % wt. Be. If the systems are in identical state, the curves of small-angle X-ray scattering must be of the same type. A formula is derived for the time needed by a system to attain a given j-th state and, on this basis, on comparing the time τ_{ij} of attaining one and the same state j of the system, i.e. one and the same intensity of small-angle X-ray scattering for some scattering angle at different temperatures, the activation energy may be calculated from the formula

$$Q_j = k \frac{T_1 T_2}{T_2 - T_1} \ln \frac{\tau_{2j}}{\tau_{1j}}. \qquad (1)$$

where k is the gas constant. The different states of a system succeed each other and correspond to the succeeding stages of the formation of segregations. Thus, for the 1st, 2nd, and 3rd j states the activation energies proved to be 13, 20, and 34 kcal/mole, respectively. The increase in activation energy in time reflects

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ACCESSION NR: AP5021945

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the physical nature of the process. Cold deformation is accompanied by the appearance of excess vacancies, rise of a stress gradient, increase in the concentration of dislocations, and, under certain conditions, increase in the concentration of packing defects. On the formation of concentration inhomogeneities owing to diffusion relaxation the lattice will repair itself. Since different types of defects disappear at different rates and the mechanism of their participation in the diffusion (and hence also the activating energy) differs, the change in the relative concentration of different defects will lead to a change in the activation energy. The role played by different defects in diffusion in deformed metals may, in its turn, be evaluated according to the activation energy of the process. Orig. art. has: 3 figures, 2 tables, and 3 formulas.

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and Alloys)

44,55

SUBMITTED: 30Sep64 ENCL: 00 SUB CODE:

NO REF SOV: 001 OTHER: 009

Card 3/3

L 6969-66 EWT(m)/EWA(c)/EWP(b)/T/EWP(t) IJP(c) JD

ACC NR: AP5017333 SOURCE CODE: UR/0181/65/007/007/2235/2237

47
B

AUTHOR: Umanskiy, Ya. S.; Prilepskiy, V. I.; Gorelik, S. S.

ORG: none

TITLE: Roentgen characteristic temperature of Ge-Si solid solutions

SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2235-2237

TOPIC TAGS: temperature characteristic, Debye temperature, elastic modulus, germanium compound, silicon compound

ABSTRACT: Roentgen characteristic temperature of Ge-Si solid solutions θ_H, was determined by x-ray methods. This value directly measures $\bar{U}^2$, the mean square displacement of atoms from equilibrium sites. The magnitude of $\bar{U}^2$ depends not only on the boundary frequency but also on the form of the thermal oscillation spectrum of the lattice. Calculated and experimental values of θ_H are compared with those of θ (Debye characteristic temperature) for Ge-Si alloys of equiatomic compositions; the calculated values are obtained from the following formula:

$$\theta = a + bT_m^{1/3}\delta^{-1}M^{-1},$$

where T_m is the melting point of the alloy, δ^3 is the atomic volume, M is the average atomic weight of the alloy, a and b are constants determined from data for pure com-

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ACC NR: AP5017333

ponents; and

$$\theta = \frac{h}{k}\left(\frac{3qN\rho}{4\pi M}\right)^{1/3} v$$

where N is Avagadro's number, ρ is density, M is molecular weight, q is the number of atoms in a molecule, v is the parameter incorporating the speed of the longitudinal and transverse waves. For the experiment, pure n-Ge and p-Si were alloyed and processed into crystals, whereupon θ_M was calculated from the thermal dependence of the x-ray intensities of the (711), (642) and (553) lines, using MoK_α radiation with a Zr filter and a scintillation counter. Values for θ were obtained by employing calorimetric and elastic modulus methods. The tabulated results for Ge-Si alloys show values ranging from 460 to 475°K for θ and from 371° to 408°K for θ_M. Orig. art. has: 1 table.

SUB CODE: SS/ SUBM DATE: 15Feb65/ ORIG REF: 002/ OTH REF: 008

Card 2/2 nda

L 8852-66 EWT(l)/EWT(m)/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) IJP(c) JD/JHB/AT

ACC NR: AP5022703 SOURCE CODE: UR/0181/65/007/009/2673/2677

AUTHOR: Umanskiy, Ya. S.; Prilepskiy, V. I.; Gorelik, S. S.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov)

TITLE: Measuring diffuse scattering of x-rays to study order in an equiatomic solid solution of germanium and silicon

SOURCE: Fizika tverdogo tela, v. 7, no. 9, 1965, 2673-2677

TOPIC TAGS: solid solution, semiconductor research, x ray scattering, ordered alloy, silicon alloy, germanium alloy

ABSTRACT: Diffuse scattering of x-rays was used for studying short-range order in an equiatomic semiconducting germanium-silicon solid solution. The experimental equipment and procedure are described. The measurements were made at room temperature at angles from 6 to 21°. Coefficients α_i associated with the localized ordering of the atoms, and the dimensional coefficients β_i determined by the difference in sizes of the component atoms were calculated for three coordination spheres by the method of least squares. The results are tabulated. The values of α_i were used for plotting a curve for the intensity of diffuse scattering by the equiatomic Ge-Si al-

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L 8852-66

ACC NR: AP5022703

loy. The formulas used for calculating the intensities are given. A curve is also shown for radial distribution of atomic density. Orig. art. has: 3 figures, 8 formulas.

SUB CODE: 20/ SUBM DATE: 19Mar65/ ORIG REF: 007/ OTH REF: 005

BVK

Card 2/2

UMANSKIY, Ya.S.; PRILEPSKIY, V.I.; GORELIK, S.S.

Studying the order in an equiatomic germanium-silicon solid solution by measuring the diffuse scattering of X rays. Fiz. tver. tela 7 no.9:2673-2677 S '65. (MIRA 18:10)

1. Moskovskiy institut stali i splavov.

UMANSKIY, Ya.S.; [illegible]SKIY, V.I.

Elastic vibration spectra and characteristic temperatures of germanium and silicon. Fiz. tver. tela 7 no.10:2958-2961 O '65. (MIRA 18:11)

1. Moskovskiy institut stali i splavov.

UMANSKIY, Ya.S.; CHIRIKOV, N.V.

Concentration inhomogeneity in deformed copper-titanium and copper-beryllium alloys. Fiz. met. i metallored. 16 no.3 [illegible] 313 Ag '63. (MIRA 16:9)

1. Moskovskiy institut stali i splavov.

UMANSKIY, Ya.S.; FADEYEVA, V.I.

Diffusion scattering of X rays by an HfC - ZrC solid solution. Fiz.-met. i metalloved. 20 no.5:719-722 N '65. (MIRA 18:12)

1. Moskovskiy institut stali i splavov. Submitted January 5, 1965.

L 16807-66 EWT(m)/EPF(n)-2/T/EWP(t) IJP(c) JD/JG

ACC NR: AP6003367 SOURCE CODE: UR/0363/66/002/001/0082/0086

AUTHOR: Umanskiy, Ya. S.; Fadeyeva, V.I.

ORG: Moscow Institute of Steel and Alloys (Moskovskiy institut stali i splavov) 47 B

TITLE: Effect of WC impurity on short-range phase separation in a TaC-NbC solid solution

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 1, 1966, 82-86

TOPIC TAGS: tungsten carbide, tantalum compound, niobium compound, carbide, solid solution

ABSTRACT: A study was made of the effect of small amounts of a third metallic component (W) on short-range order in the (Ta, Nb)C solid solution and on the kinetics of its establishment as compared to an unalloyed solid solution. One mole % of WC was dissolved in a TaC-NbC solid solution of stoichiometric composition. The intensity distribution of diffuse x-ray scattering caused by the short-range order was determined with a URS-50I diffractometer. The small amount of WC introduced was found to cause local distortions in the alloy, promoting an increase in the diffusional mobility of tantalum

Card 1/2

UDC: 54-165